

CROCANTE (Radio channel characterization, optimization and calibration of antenna “GEODA” for space communications) is a research project funded by Spanish Ministry of Education and Science through the National R+D+i Plan.

The aim of the project is to develop a demonstrator of the antenna GEODA.

The **CROCANTE Project** was officially launched on January 1, 2009 and will last until December 31, 2011. This project is developed in cooperation by Universidad Politécnica de Madrid and Universidade de Vigo

The main proposed research tasks are:

- Modeling, Measuring and Calibration of the antenna GEODA to study algorithms of DOA and new beam forming algorithms.
- Study of the procedures of conforming selection and of antenna or beam selection, including MIMO techniques that improve the operation for low elevation angles.
- Study, modeling and measurement of the propagation channel with real satellites. The increase of the available power in the satellites and the improvement of the sensitivity of the terminals have reduced the technological limitations that forced to the use of direct line of sight in satellite-earth links and to avoid the use of satellites with low angles of elevation. There is not model, nor a rigorous characterization, of those effects and an improved characterization of the radio channel is proposed.
- Related the optimization of the GEODA antenna system, the extension of the working frequency band, the capacity for signal transmission, and the possibility of generate several beams by the antenna panel, are considered.

Universidade de Vigo is in charge of subproject 2: **Characterization and Modeling of the Low-Elevation Satellite-Earth Radio Channel at L-band**

The primary targets of this subproject are the characterization and modeling of the radio-channel satellite-earth for low elevation satellites and the development of diversity techniques in the terrestrial terminal to mitigate the undesired effects of propagation. In addition to this global a series of individual missions are identified necessary to reach them:

1. Modeling of the Scattering of electromagnetic waves by trees.
2. Development of models of Scattering on constructive obstacles adapted to the frequency of the system
3. Development of statistical models empirical/of the channel radio satellite-earth with grazing incidence in L band, including layout of rays and chains of Markov.
4. Extension of the data base of measures of ionospheric the troposphere effects and for low angles of elevation.
5. Contribution to the studies and models of ITU - R on channel satellite-earth.
6. Optimization of the systems of reception with diversity.

Part of the project outcomes have been published:

Paula Gómez Pérez, "Measurement, characterization and modeling of vegetation barriers to reduce electromagnetic pollution in sensitive areas", Ph.D. Thesis. Vigo, October 2010.

D.Rey, M.G.Sánchez, A.V.Alejos, I.Cuiñas, "Empirical Propagation Model for Low Elevation Satellites", European Microwave Conference EuMW2010, European Microwave Association. París (France), 2010.

Iñigo Cuiñas, Paula Gómez, Ana Vázquez Alejos, Manuel García Sánchez, José E. Acuña "Reduction of interferences to adjacent networks by combined lattice structures and shrub barriers" Internacional Conference on Wireless Information Networks and Systems Milán (Italia), 2009

Aitor Novo García, María Vera Isasa, Manuel Sierra Pérez, "3x3 Microstrip Beam Forming Network for Multibeam Triangular Array", 10th Mediterranean Microwave Symposium MMS'2010, Cyprus, August 2010

A. Novo García, M. Vera-Isasa, Javier García-Gasco Trujillo, M.Sierra-Pérez, " 6x3 Microstrip Beam Forming Network for Multibeam Triangular Array", Proceedings of the PIERS, Marrakesh, March 2011.

A. Novo García, M. Vera-Isasa, Javier García-Gasco Trujillo, M.Sierra-Pérez, " Comparative Study of Two Microstrip Beam Forming Networks for Multibeam Triangular Array", Proceedings of the PIERS, Marrakesh, March 2011.

Iñigo Cuiñas, Paula Gómez, Ana V. Alejos, Manuel García Sánchez "Reducing Electromagnetic Pollution by Shrub Lines Supported by Lattice Structures" Electronics Letters, vol.45, no.13, pp.664-666,18 June 2009.

P.Gómez, I.Cuiñas, A.V.Alejos, Manuel García Sánchez, R.Caldeirinha "Shrub-Blown Time-Variability in Attenuation and Scattering at Cellular Frequencies". IET Microwaves, Antennas & Propagation. Vol. 4, Iss. 4, pp. 526–542. April 2010.

José Antonio Gay-Fernández, Manuel G. Sánchez, Iñigo Cuiñas, Ana V. Alejos, Javier G. Sánchez, José Luis Miranda-Sierra "Propagation Analysis and Deployment of a Wireless Sensor Network in a Forest" Progress In Electromagnetics Research (PIER), no.106, pp. 121-145, Julio 2010.

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Written by Administrator

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*Detailed information about the project can be found contacting your local partner: Universidade de Vigo, **Radio Systems Group**.*



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